

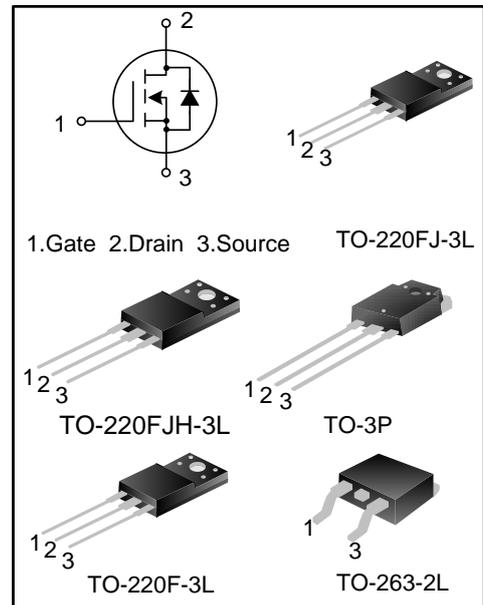
12A, 800V DP MOS POWER TRANSISTOR

DESCRIPTION

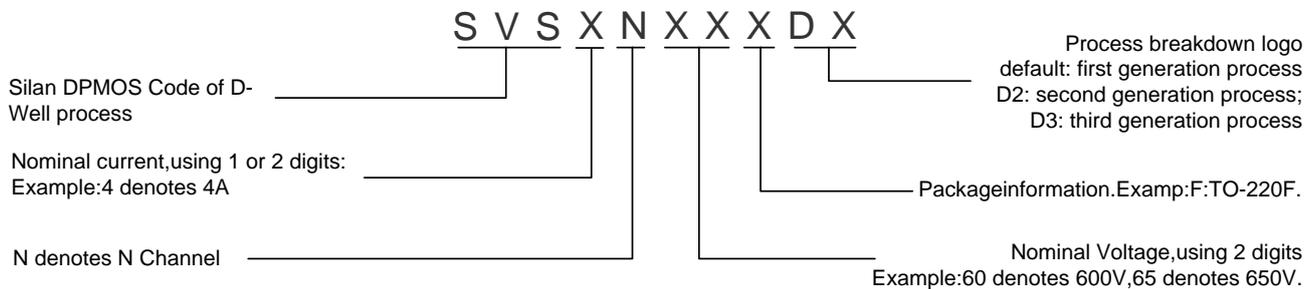
SVS12N80F/FJ/S/FJH/PN is an N-channel enhancement mode high voltage power MOSFETs produced using Silan's DP MOS technology. It achieves low conduction loss and switching losses. It leads the design engineers to their power converters with high efficiency, high power density, and superior thermal behavior. Furthermore, it's universal applicable, i.e., suitable for hard and soft switching topologies.

FEATURES

- ◆ 12A,800V, $R_{DS(on)(typ.)}=0.37\Omega@V_{GS}=10V$
- ◆ New revolutionary high voltage technology
- ◆ Ultra low gate charge
- ◆ Periodic avalanche rated
- ◆ Extreme dv/dt rated
- ◆ High peak current capability



NOMENCLATURE



ORDERING INFORMATION

Part No.	Package	Marking	Hazardous Substance Control	Packing
SVS12N80F	TO-220F-3L	SVS12N80F	Halogen free	Tube
SVS12N80FJ	TO-220FJ-3L	SVS12N80FJ	Halogen free	Tube
SVS12N80S	TO-263-2L	SVS12N80S	Halogen free	Tube
SVS12N80STR	TO-263-2L	SVS12N80S	Halogen free	Tape&Reel
SVS12N80FJH	TO-220FJH-3L	12N80FJH	Halogen free	Tube
SVS12N80PN	TO-3P	12N80	Pb free	Tube

ABSOLUTE MAXIMUM RATINGS (Unless otherwise noted, $T_C=25^\circ\text{C}$)

Characteristics	Symbol	Ratings			Unit
		SVS12N80F/FJ/FJH	SVS12N80S	SVS12N80PN	
Drain-Source Voltage	V_{DS}	800			V
Gate-Source Voltage	V_{GS}	± 30			V
Drain Current	I_D	$T_C=25^\circ\text{C}$			A
		$T_C=100^\circ\text{C}$			
Drain Current Pulsed	I_{DM}	48			A
Power Dissipation ($T_C=25^\circ\text{C}$) - Derate above 25°C	P_D	40	150	169	W
		0.32	1.20	1.35	W/ $^\circ\text{C}$
Single Pulsed Avalanche Energy (Note 1)	E_{AS}	702			mJ
Body diode (Note 2)	dv/dt	15			V/ns
MOSFET dv/dt ruggedness (Note 3)	dv/dt	50			V/ns
Operation Junction Temperature Range	T_J	$-55\sim+150$			$^\circ\text{C}$
Storage Temperature Range	T_{stg}	$-55\sim+150$			$^\circ\text{C}$

THERMAL CHARACTERISTICS

Characteristics	Symbol	Ratings			Unit
		SVS12N80F/FJ/FJH	SVS12N80S	SVS12N80PN	
Thermal Resistance, Junction-to-Case	$R_{\theta JC}$	3.13	0.83	0.74	$^\circ\text{C/W}$
Thermal Resistance, Junction-to-Ambient	$R_{\theta JA}$	62.5	62.5	50	$^\circ\text{C/W}$

ELECTRICAL CHARACTERISTICS (Unless otherwise noted, $T_c=25^\circ\text{C}$)

Characteristics	Symbol	Test conditions	Min.	Typ.	Max.	Unit
Drain -Source Breakdown Voltage	BV_{DSS}	$V_{GS}=0V, I_D=250\mu A$	800	--	--	V
Drain-Source Leakage Current	I_{DSS}	$V_{DS}=800V, V_{GS}=0V$	--	--	1.0	μA
Gate-Source Leakage Current	I_{GSS}	$V_{GS}=\pm 30V, V_{DS}=0V$	--	--	± 100	nA
Gate Threshold Voltage	$V_{GS(th)}$	$V_{GS}=V_{DS}, I_D=250\mu A$	2.0	--	4.0	V
Static Drain- Source On State Resistance	$R_{DS(on)}$	$V_{GS}=10V, I_D=6A$	--	0.37	0.45	Ω
Gate Resistance	R_g	$f=1.0\text{MHz}$	--	3.8	--	Ω
Input Capacitance	C_{iss}	$f=1\text{MHz}, V_{GS}=0V,$ $V_{DS}=100V$	--	1090	--	pF
Output Capacitance	C_{oss}		--	55	--	
Reverse Transfer Capacitance	C_{rss}		--	8.7	--	
Turn-on Delay Time	$t_{d(on)}$	$V_{DD}=400V, V_{GS}=10V, R_G=24\Omega,$ $I_D=12A$ (Note 4,5)	--	21	--	ns
Turn-on Rise Time	t_r		--	45	--	
Turn-off Delay Time	$t_{d(off)}$		--	171	--	
Turn-off Fall Time	t_f		--	43	--	
Total Gate Charge	Q_g	$V_{DD}=640V, V_{GS}=10V,$ $I_D=12A$ (Note 4,5)	--	52	--	nC
Gate-Source Charge	Q_{gs}		--	7.6	--	
Gate-Drain Charge	Q_{gd}		--	31	--	

SOURCE-DRAIN DIODE RATINGS AND CHARACTERISTICS

Characteristics	Symbol	Test conditions	Min.	Typ.	Max.	Unit
Continuous Source Current	I_S	Integral Reverse P-N Junction	--	--	12	A
Pulsed Source Current	I_{SM}	Diode in the MOSFET	--	--	48	
Diode Forward Voltage	V_{SD}	$I_S=12A, V_{GS}=0V$	--	--	1.4	V
Reverse Recovery Time	T_{rr}	$I_S=12A, V_{GS}=0V,$	--	430	--	ns
Reverse Recovery Charge	Q_{rr}	$di_f/dt=100A/\mu s$ (Note 4)	--	6.5	--	μC

Notes:

- $L=79\text{mH}, I_{AS}=4.0A, V_{DD}=100V, R_G=25\Omega,$ starting $T_J=25^\circ\text{C}$;
- $V_{DS}=0\sim 400V, I_{SD}\leq 12A, T_J=25^\circ\text{C}$;
- $V_{DS}=0\sim 480V$;
- Pulse Test: Pulse width $\leq 300\mu s,$ Duty cycle $\leq 2\%$;
- Essentially independent of operating temperature.

TYPICAL CHARACTERISTICS

Figure 1. On-Region Characteristics

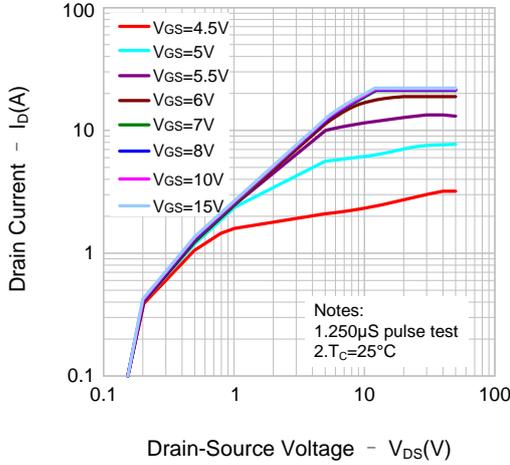


Figure 2. Transfer Characteristics

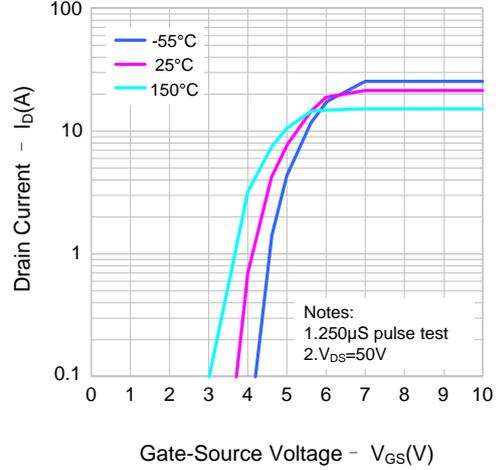


Figure 3. On-Resistance Variation vs. Drain Current

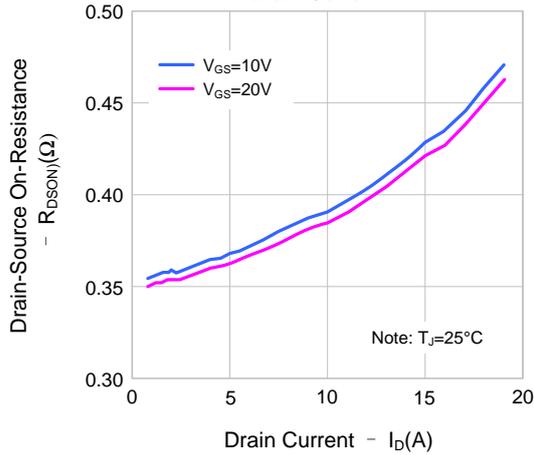


Figure 4. Body Diode Forward Voltage Variation vs. Source Current and Temperature

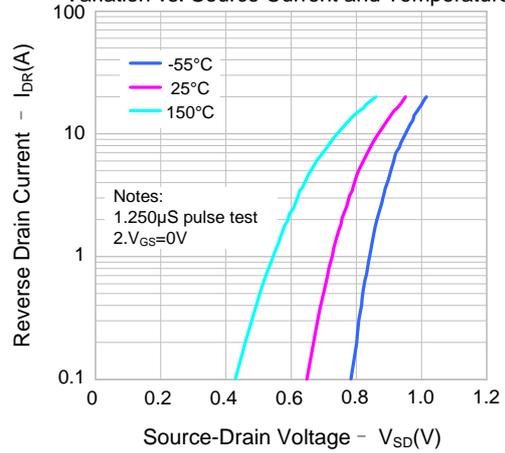


Figure 5. Capacitance Characteristics

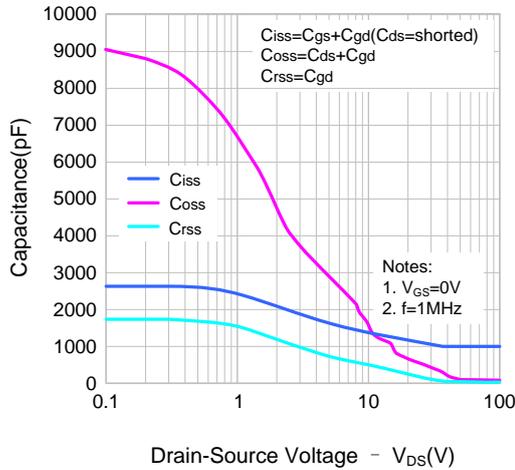
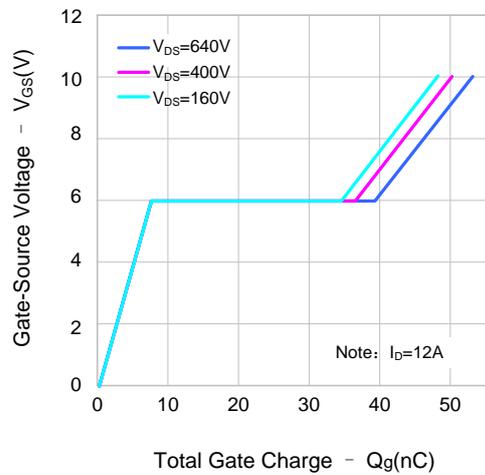


Figure 6. Gate Charge Characteristics



TYPICAL CHARACTERISTICS (continued)

Figure 7. Breakdown Voltage Variation vs. Temperature

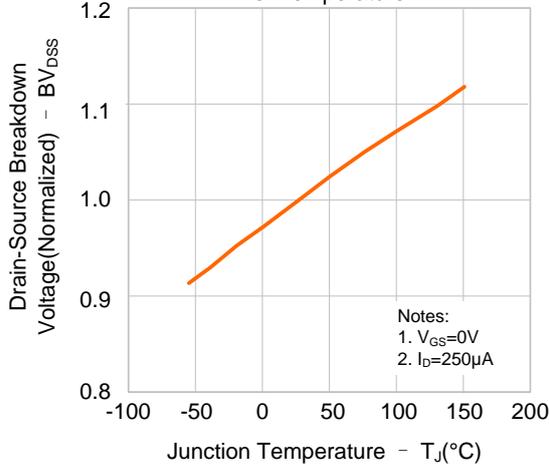


Figure 8. On-resistance Variation vs. Temperature

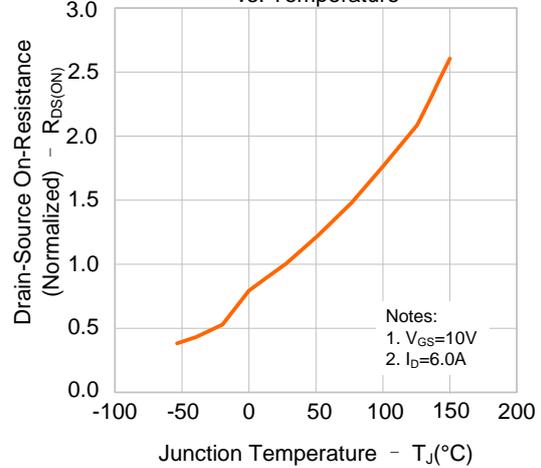


Figure 9-1. Max. Safe Operating Area (SVS12N80F/FJ/FJH)

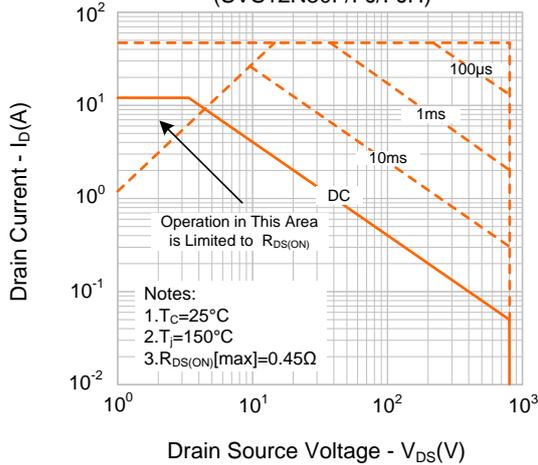


Figure 9-2. Max. Safe Operating Area (SVS12N80S)

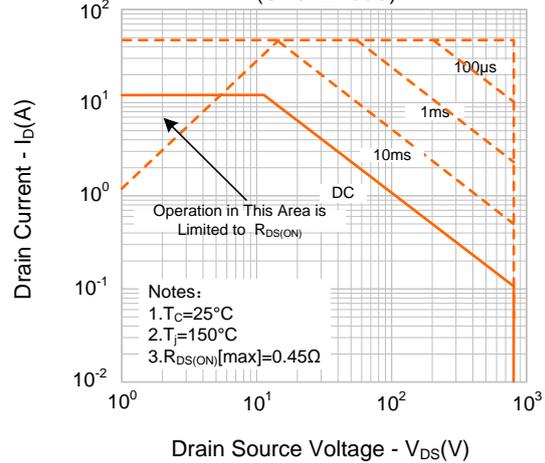
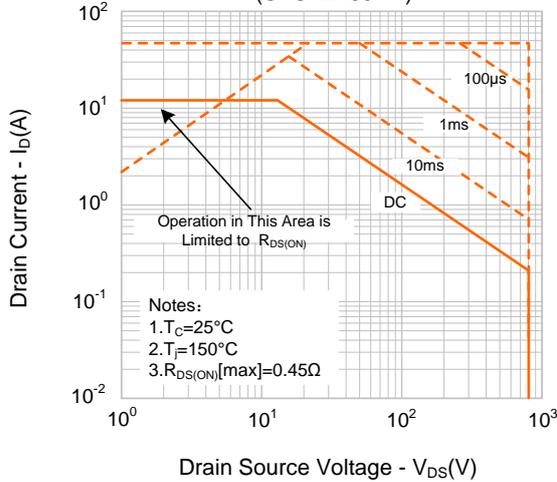
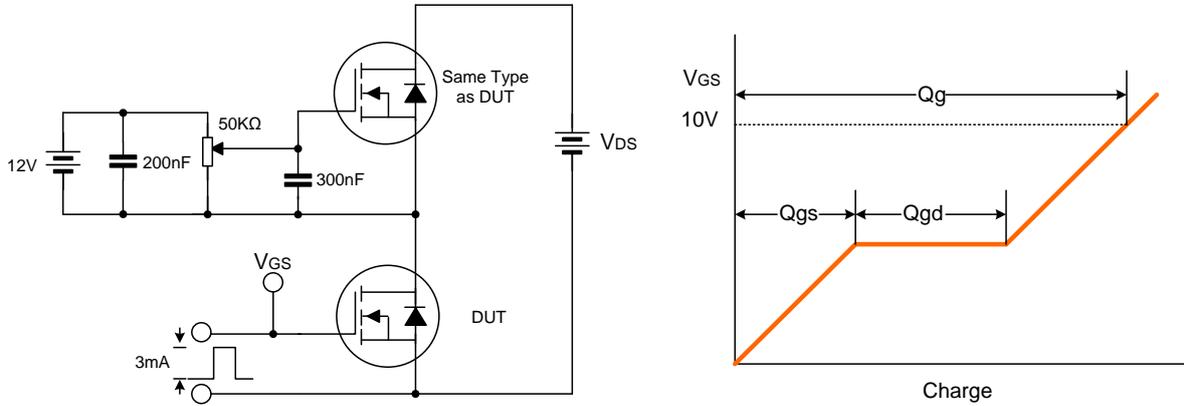


Figure 9-3. Max. Safe Operating Area (SVS12N80PN)

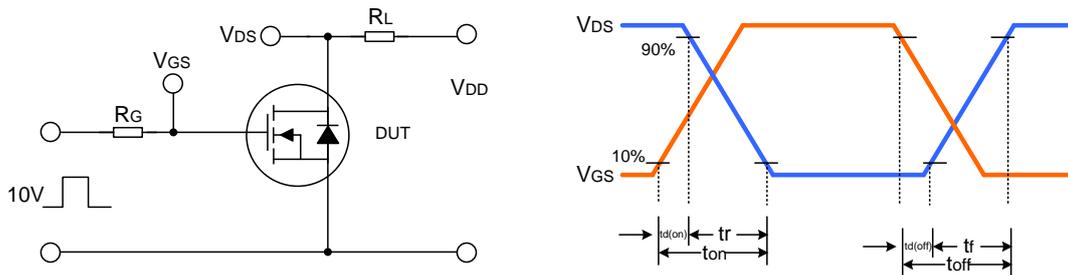


TYPICAL TEST CIRCUIT

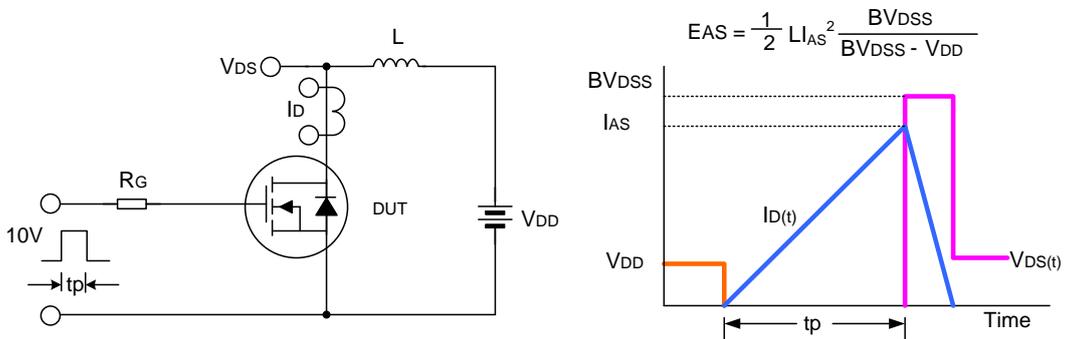
Gate Charge Test Circuit & Waveform



Resistive Switching Test Circuit & Waveform



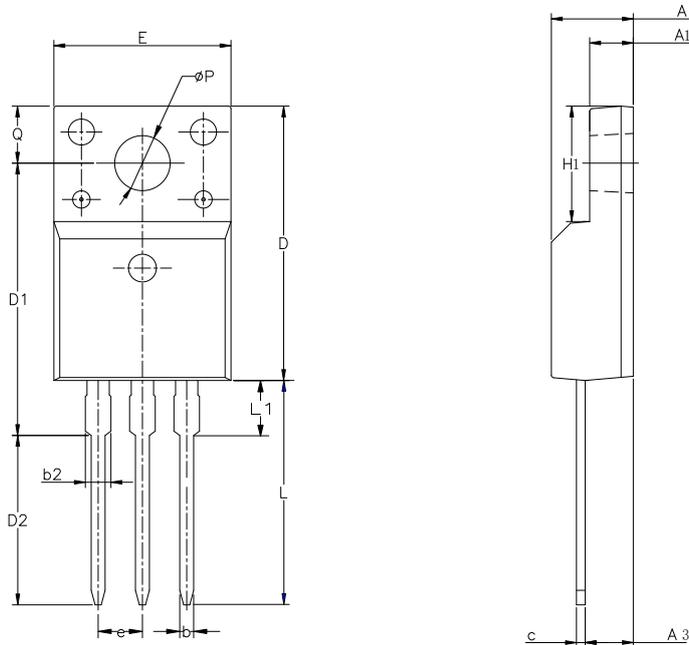
Unclamped Inductive Switching Test Circuit & Waveform



PACKAGE OUTLINE

TO-220F-3L

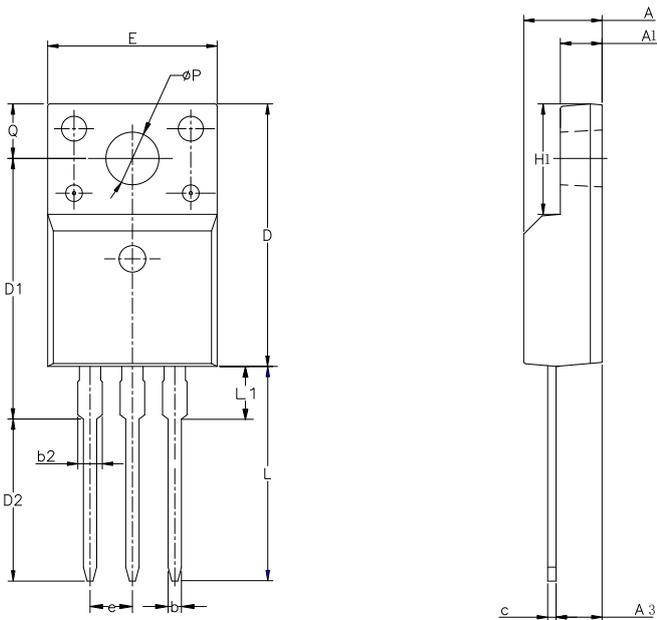
UNIT: mm



SYMBOL	MIN	NOM	MAX
A	4.42	4.70	5.02
A1	2.30	2.54	2.80
A3	2.50	2.76	3.10
b	0.70	0.80	0.90
b2	—	—	1.47
c	0.35	0.50	0.65
D	15.25	15.87	16.25
D1	15.30	15.75	16.30
D2	9.30	9.80	10.30
E	9.73	10.16	10.36
e	2.54BCS		
H1	6.40	6.68	7.00
L	12.48	12.98	13.48
L1	/	/	3.50
ϕP	3.00	3.18	3.40
Q	3.05	3.30	3.55

TO-220FJ-3L

UNIT: mm

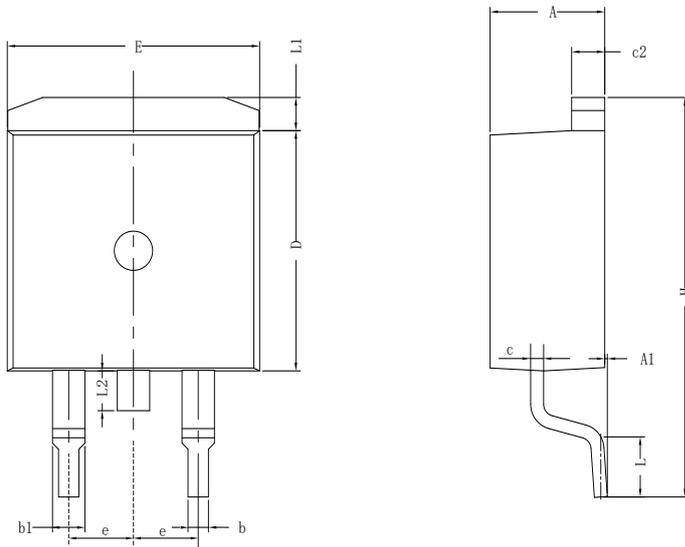


SYMBOL	MIN	NOM	MAX
A	4.42	4.70	5.02
A1	2.30	2.54	2.80
A3	2.50	2.76	3.10
b	0.55	0.70	0.85
b2	—	—	1.29
c	0.35	0.50	0.65
D	15.25	15.87	16.25
D1	13.97	14.47	14.97
D2	10.58	11.08	11.58
E	9.73	10.16	10.36
e	2.54BCS		
H1	6.40	6.68	7.00
L	12.48	12.98	13.48
L1	—	—	2.00
ϕP	3.00	3.18	3.40
Q	3.05	3.30	3.55

PACKAGE OUTLINE (Continued)

TO-263-2L

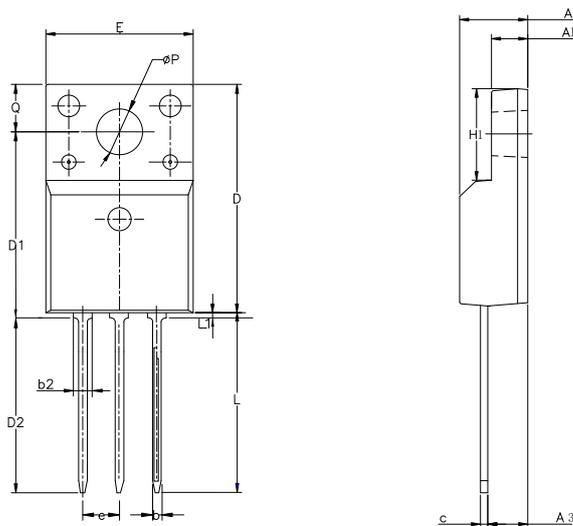
UNIT: mm



SYMBOL	MIN	NOM	MAX
A	4.30	4.57	4.72
A1	0	0.10	0.25
b	0.71	0.81	0.91
c	0.30	---	0.60
c2	1.17	1.27	1.37
D	8.50	---	9.35
E	9.80	---	10.45
e	2.54BSC		
H	14.70	---	15.75
L	2.00	2.30	2.74
L1	1.12	1.27	1.42
L2	---	---	1.75

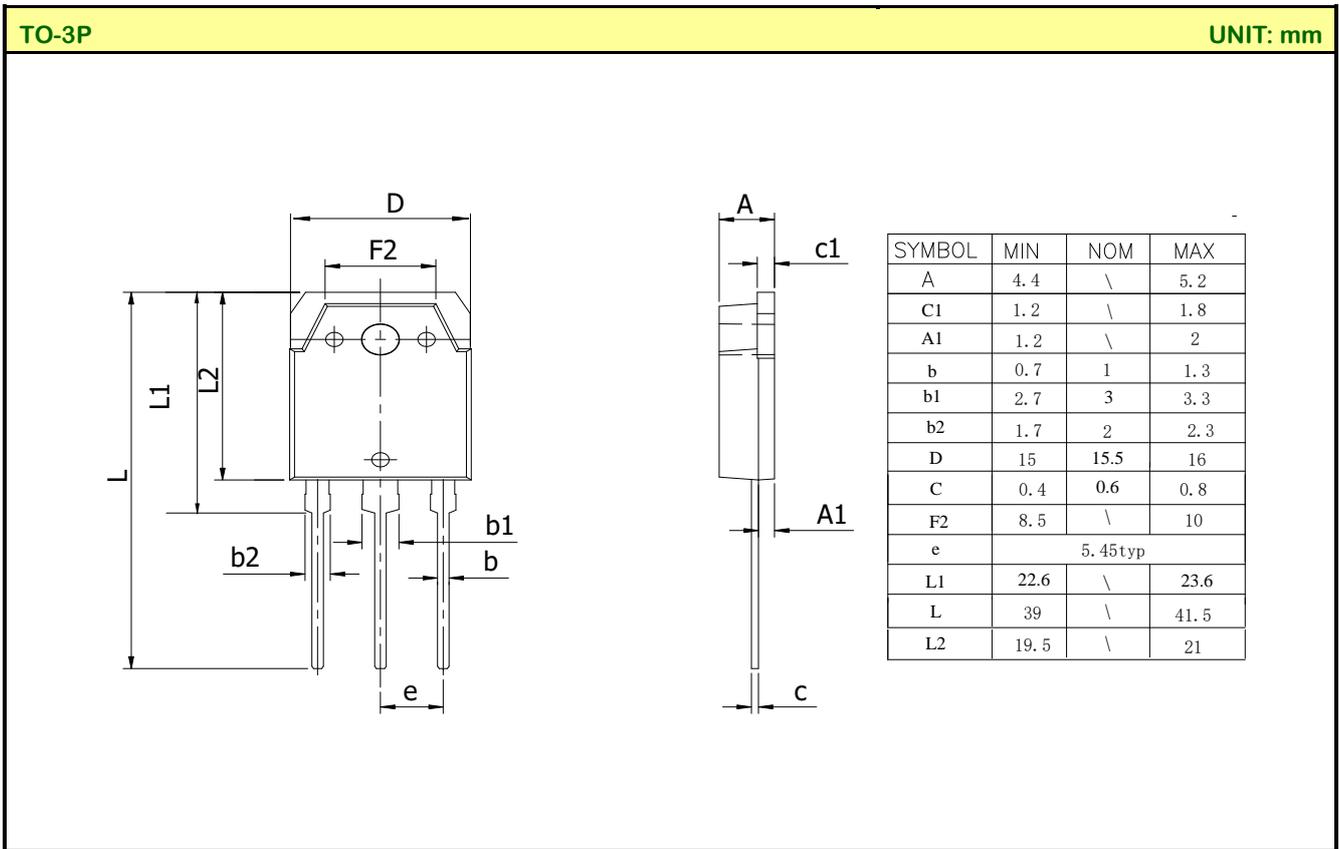
TO-220FJH-3L

UNIT: mm



SYMBOL	MIN	NOM	MAX
A	4.42	4.70	5.02
A1	2.30	2.54	2.80
A3	2.50	2.76	3.10
b	0.55	0.70	0.80
b2	---	---	1.29
c	0.35	0.50	0.65
D	15.25	15.87	16.25
D1	12.87	13.07	13.27
D2	12.28	12.48	12.68
E	9.73	10.16	10.36
e	2.54BCS		
H1	6.40	6.68	7.00
L	12.48	12.98	13.48
L1	---	---	0.85
phi P	3.00	3.18	3.40
Q	3.05	3.30	3.55

PACKAGE OUTLINE (Continued)



Disclaimer :

- Silan reserves the right to make changes to the information herein for the improvement of the design and performance without prior notice! Customers should obtain the latest relevant information before placing orders and should verify that such information is complete and current.
- All semiconductor products malfunction or fail with some probability under special conditions. When using Silan products in system design or complete machine manufacturing, it is the responsibility of the buyer to comply with the safety standards strictly and take essential measures to avoid situations in which a malfunction or failure of such Silan products could cause loss of body injury or damage to property.
- Silan will supply the best possible product for customers!

Part No.: SVS12N80F/FJ/S/FJH/PN Document Type: Datasheet
Copyright: HANGZHOU SILAN MICROELECTRONICS CO.,LTD Website: <http://www.silan.com.cn>

Rev.: 1.6

Revision History:

1. Add TO-3P
-

Rev.: 1.5

Revision History:

1. Add SVS12N80FJH
-

Rev.: 1.4

Revision History:

1. Add SVS12N80FJ、SVS12N80S
-

Rev.: 1.3

Revision History:

1. Modify the electrical characteristics
 2. Modify the source-drain diode ratings and characteristics
 3. Modify the figure 6
-

Rev.: 1.2

Revision History:

1. Modify the ordering information
-

Rev.: 1.1

Revision History:

1. Modify the package information
-

Rev.: 1.0

Revision History:

1. First release
-
-